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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/822,686

04/13/2004

Hyo-suk Kim

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EXAMINER

LOPEZ, FRANK D

ART UNIT

PAPER NUMBER

3745

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

04/13/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/822,686

Applicant(s)

KIM, HYO-SUK

Examiner

F. Daniel Lopez

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3745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                                                |                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                                           | 5) <input type="checkbox"/> Notice of Informal Patent Application                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>4/13, 4/18, 12/4 of 06.</u> | 6) <input type="checkbox"/> Other: ____                                                |

### ***Specification***

The disclosure is objected to because of the following informalities:

paragraph 35 states "Fig. 6B represents the input waveform...when a center point...of the upper core 4a passes a middle point...between the first sensor coil 2a and the second sensor coil 2b" is wrong, since it shows the waveform as the cores move back and forth. It would be helpful to know when, during the cycle, the upper core passes the middle point, but this is not shown in fig 6B.

Paragraph 37 states "when the upper core origin is inclined toward the first sensor coil 2a", which is confusing. Is this a situation where the center of movement of the core is closer to the first coil than the second coil?

Paragraph 41 states "When the second output Vo...is at the second zero point during the compression stroke...the piston is at a top original position. The top origin position is also passed during an extension stroke. The top origin is a fixed position, and an exact position of the top dead center can be estimated by measuring the amount of time that the piston takes to pass the top origin twice". If the top origin is passed twice, shouldn't there be two second zero points? This is not shown by the graph of fig 8. It is assumed that the top dead center is estimated by integrating the speed of the core over a first half of the time between passing the origin twice. But, how is the speed calculated? This is at the end of the movement of the piston, so the piston is moving relatively slowly, stops, and then reverses direction. There appears to be no way shown to estimate the speed during this time, and therefore, the position of top dead center can't be estimated. If applicant has a different way to estimate the position of top dead center, it needs to be disclosed.

Appropriate correction is required. No new matter can be entered.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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Claims 6-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 6-12 and 15 all claim a controller or a method of controlling, which finds a top dead center position of a piston stroke. The specification shows how to measure a time it takes a core to pass a particular point twice. But there is no discussion of how to use the time to estimate the top dead position. As discussed in the objection to the specification, the most likely way to use the time to calculate the top dead center is to integrate the speed of the piston over a first half of the time, but there is no way shown of estimating the speed during this part of the piston movement.

Claims 1-10 and 15-22 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1 line 4-5 “the length of the first sensor coil and the second sensor coil in series” is confusing, as to what the “in series” is modifying. Perhaps applicant is trying to claim that the length of the upper core is half the length of the first sensor coil plus the length of the second sensor coil.

In claim 15 line 5 --each— should be added before “less”, to indicate that each of the upper and lower parts are less than half of the coil length.

Claims not specifically mentioned are indefinite, since they depend from one of the above claims.

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-22 are rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. The sole purpose of the core having two parts is to be able to calculate the top dead center. But, as discussed above, the specification does not show how to calculate the top dead center from just the measured time. Since the purpose of the core having two parts has not been met by the disclosure, it does not have utility.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3 are rejected under 35 U.S.C. § 102(b) as being anticipated by Shimizu et al. Shimizu et al discloses a piston cylinder device comprising including first and second cores (21b) spaced from each other by a predetermined distance forming a core combined with the piston (21e); first and second sensor coils (A2, B2, C2, D2) detecting a position of the core, and wherein the first core is shorter than half the lengths of the first and second sensor coils combined. Shimizu et al states the "length of each coil is substantially equal to the length of each magnetic ring 21b" (column 6 line 10-11), which means that the coils can have exactly the same length, a slightly larger or a slightly smaller length as the magnetic ring. When the coils are slightly larger than the core, it meets this limitation.

Note that the term "linear compressor" is considered intended use, and therefore given no patentable weight.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made

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to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Claims 15, 18 and 19 are rejected under 35 U.S.C. § 103 as being unpatentable over Uchida et al in view of Shimizu et al. Uchida et al discloses a piston cylinder device comprising a controller controlling a position of a piston by determining a top dead center based on signals from a position sensor; wherein the position sensor includes a sensor body (342, 343) and a "core" (325) attached to the piston and centered in the sensor body; but does not disclose that the position sensor includes a coil including first and second sensor coils in the sensor body, forming an annular body with an aperture, the core having upper and lower parts coaxial with the aperture; and wherein the upper and lower parts are each less than one half the length of the coil.

Shimizu et al teaches, for a piston cylinder device comprising a position sensor, which; includes a sensor body (20) and a "core" (21) attached to the piston and centered in the sensor body; that the position sensor includes a coil including first and second sensor coils (A2, B2, C2, D2) in the sensor body, forming an annular body with an aperture, the core having upper and lower parts (21b) coaxial with the aperture; and wherein the upper and lower parts are each less than one half the length of the coil.


Since the position sensors of Uchida et al and Shimizu et al are interchangeable in the piston art; it would have been obvious at the time the invention was made to one having ordinary skill in the art to replace the position sensor of Uchida et al with a position sensor which includes a coil including first and second sensor coils in the sensor body, forming an annular body with an aperture, the core having upper and lower parts coaxial with the aperture; and wherein the upper and lower parts are each less than one half the length of the coil, as taught by Shimizu et al, as a matter of engineering expediency.

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**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dan Lopez whose telephone number is 571-272-4821. The examiner can normally be reached on Monday-Thursday from 6:10 AM -3:40 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Look, can be reached on 571-272-4820. The fax number for this group is 571-273-8300. Any inquiry of a general nature should be directed to the Help Desk, whose telephone number is 1-800-PTO-9199.

A handwritten signature in black ink, appearing to read "F. Daniel Lopez", with a stylized flourish extending from the end.

F. Daniel Lopez  
Primary Examiner  
Art Unit 3745  
April 5, 2007